

REMARKS

In response to the office action mailed July 12, 2005, applicant is amending the claims to better define the invention. Applicant has canceled claims 21-30. No additional fee should be due, however if any is due, please charge it to Bracewell & Patterson Deposit Account No. 50-0259.

The claims as amended deal with a method of forming part with an aluminum alloy. The claims require delivering a feedstock through a nozzle, the feedstock comprises an aluminum and at least one alloy element in a quantity that is greater than an equilibrium solute level for the alloy element in aluminum. The claims requires moving the heat source in the nozzle away from the molten pool such that the molten pool rapidly cools, the rapid cooling causing a rapid solidification of the alloy element within the aluminum part.

As explained in the specification on pages 9 and 10, certain alloy elements have advantages when alloyed with aluminum. However they are limited by their equilibrium solubility. That is, the alloy element will only dissolve to a certain extent, and the rest will precipitate during a normal casting procedure. Applicant is able to achieve a higher alloy element content than is normally possible by adding the additional alloy element during a rapid solidification process involving applying a heat source to a feedstock to form a weld pool, and moving the work piece and heat source relative to each other to form a part.

This rapid solidification process increases the amount of alloy that will dissolve in aluminum. For example, the alloy of lithium has an equilibrium solute that is typically about 3%, but when utilizing the RSP process called for in claim 1, the content can achieve 4%.

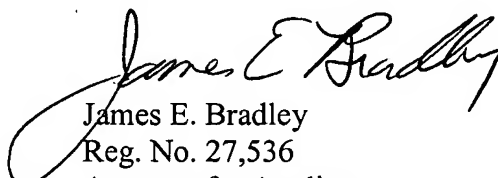
Scandium has an equilibrium solute of about 0.5% by weight in aluminum. By using the RSP process of claim 1, the weight percentage of scandium can increase from 0.6% to 1.5%. Other alloys can be added as well, such as manganese and zirconium for their beneficial properties.

The Lewis reference describes a process for forming articles from materials in particulate form. However Lewis does not describe alloying as claimed. There is no mention in Lewis of adding an amount of alloy greater than the equilibrium solute level of the alloy. Lewis makes no mention of scandium and lithium alloys in aluminum. Lewis does mention feeding more than one alloy element into a laser beam , but does not discuss equilibrium solute levels.

Similarly, Keicher discloses feeding different powders simultaneously into a heat source, but does not disclose feeding powders having alloys greater than their equilibrium solute levels. Bialach was cited only for the purpose of disclosing a feed wire as opposed to powder.

It is respectfully submitted that the claims are now in condition for allowance and favorable action is respectfully requested.

Respectfully submitted,


James E. Bradley
Reg. No. 27,536
Attorney for Applicant

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BRACEWELL & GIULIANI LLP
P. O. Box 61389
Houston, Texas 77208 1389
Tel.: (713) 221-3301
Fax: (713) 222-3287